# TRANSFERABILITY OF BUDGETS FOR COMMUNITY SERVICES

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## ABSTRACT

This report investigates the applicability of transferring estimates of needs, capital costs, and operating costs for specific community services in one area to another area. Based upon studies of rural water systems and rural fire protection services completed by the ERS local decisions project and Oklahoma State University, estimates of needs are area-specific. Estimates of costs are also area-specific unless the areas are very similar and within the same general region of the United States.

Keywords: Budgeting, Community services, Cost estimates, Decisionmaking.



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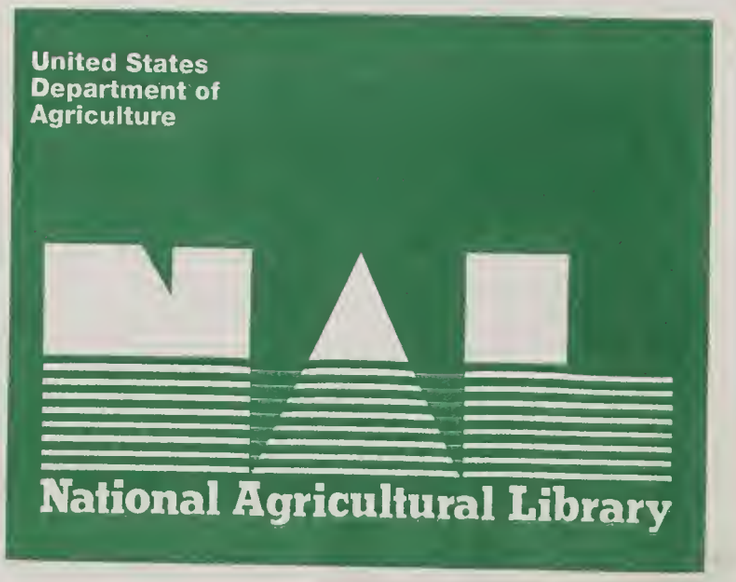

## INTRODUCTION AND OBJECTIVES

The "Local Decisions Project" of the Economic Development Division began in 1973. The primary objectives of this project are to:

1. Assist community leaders and citizens to make their own informed decisions by providing economic research about problems they identify,
2. Develop analytical techniques for use by other communities, and
3. Guide future research by observing research usage and the decisionmaking process.

Originally the project worked with communities in the Great Plains area of western Oklahoma, a region then characterized by declining and sparse population patterns. In 1978, the study area was moved to the Ozarks area of southwest Missouri and northeast Oklahoma, a region characterized by rapid population growth and more dense settlement patterns.

Studies completed by project personnel include budgets for community services, facility location analyses, community economics and impact analyses, and summaries of community development practice. Most of the project's emphasis has been on developing budgets for various community services. These include:

1. Ambulance services
2. Health clinics
3. Nursing homes
4. Rental apartments
5. Fire protection
6. Law enforcement
7. Industrial parks
8. Litter control
9. Animal control
10. Water systems
11. Sewer systems
12. Solid waste systems

For most of the above services and facilities, research publications present methods for estimating need or usage, capital costs, and operating costs for various alternatives. These methods can be used by other communities in the Great Plains or Ozarks region.

## OBJECTIVES

Usage of these techniques by communities in other regions raises the question of transferability of usage estimates, capital costs, and operating costs from the Great Plains or Ozarks to other areas of the Nation. This report provides a partial answer to this question by comparing the Local Decision project's study of Missouri water systems (3) with an Oklahoma State University study of Oklahoma water systems (2) and by comparing the project's Great Plains study (1) and Ozarks study (4) of rural fire protection. Specific objectives include:

1. Comparison of need or usage estimates,
2. Comparison of capital cost items,
3. Comparison of selected operating cost items for the studies above.

Differences in usage estimates may be caused by both area characteristics and by changes in demand over time. Differences in cost estimates may result from both area characteristics and from the usage of nationwide price indices to update costs over time.

## USAGE AND COSTS FOR RURAL WATER SYSTEMS

Comparing results of the two water studies, water usage per hookup varies considerably among regions, even within the same State (table 1). Oklahoma households in 1976-77 used more water than Missouri households in 1978. Water usage per rural household has historically been increasing; 1978 differences would likely be even greater. The sizes of treatment and storage facilities depend on the water system's total daily consumption. For a typical rural system of 200 hookups, treatment and storage facilities would be 25 percent larger in northern Missouri and 53 percent

Table 1--Comparison of water usage for rural households and farms served by rural water districts, Missouri and Oklahoma.

| Area and year | Gallons per month | | Gallons per day |
|---|---|---|---|
| | Per hookup | 200 hookups | 200 hookups |
| Oklahoma, 1976-77 | 6,900 | 1,380,000 | 46,000 |
| Missouri Ozarks, 1978 | 4,522 | 904,400 | 30,147 |
| Remainder of Missouri, 1978 | 5,671 | 1,134,200 | 37,807 |

Sources: (2,3).

larger in Oklahoma than in the Missouri Ozarks. Such differences would affect engineering plans and capital costs. Estimates of usage do vary by regions.

Capital costs per unit for pipes, valves, and meters were substantially higher in the Missouri Ozarks than in the rest of Missouri and in Oklahoma (table 2). Costs differed by 67 percent between northern Missouri and the Missouri Ozarks. Oklahoma and northern Missouri costs for a typical rural water distribution system differed by only 12 percent. This undoubtedly reflects the costs of installing water lines in hilly, rocky terrain. Missouri costs were for the same year and are thus not affected by the usage of nationwide price indices. Capital cost estimates from one area could be used in a neighboring region provided the terrain is very similar. However, estimates should not be transferred to regions of differing topography.

Annual operating costs for similar types of water supply also varied by region (table 3). Operating costs for water districts with well supplies were 20 percent higher in Oklahoma than in Missouri. On the other hand, Missouri water districts purchasing treated water had operating costs 31 percent greater than similar Oklahoma districts.

## FREQUENCY OF FIRES AND COSTS FOR RURAL FIRE PROTECTION SERVICES

The Ozarks region had a greater need for fire protection than the Great Plains region as evidenced by estimated annual fire frequency coefficients (table 4). This was especially true for residential and business fires which were about three times more frequent in the Ozarks than in the Great Plains. The incidence of fires appears to vary considerably between regions.

From 1974 to 1978, the total number of fires in Oklahoma reported to the State Fire Marshall's office increased about 20 percent. It is impossible to determine if this reflected an increase in actual fires or only an increase in the number of fires reported. In 1979, with a new reporting system initiated, the number of reported fires was less than that in 1974. But even a 20 percent increase in the actual number of fires in the Great Plains would not significantly alter the differences in fire frequencies between the Great Plains and Ozarks region.

Table 2--Comparison of selected capital costs for water distribution systems, Missouri and Oklahoma, Dec. 1978.

| Item Installed | Unit | Oklahoma 1/ | Missouri | |
|---|---|---|---|---|
| | | | Ozarks | Remainder of State |
| | | Dollars | | |
| Polyvinyl chloride pipe | | | | |
| 1" Class 315 | lineal foot | 1.61 | 2.55 | 1.46 |
| 2" Class 160 | do | .89 | 1.61 | .92 |
| 2 1/2" Class 160 | do | .99 | 1.67 | .96 |
| 3" Class 160 | do | 1.36 | 2.26 | 1.30 |
| 4" Class 160 | do | 1.75 | 2.68 | 1.53 |
| 6" Class 160 | do | 2.96 | 4.09 | 2.34 |
| 8" Class 160 | do | 4.70 | 6.08 | 3.48 |
| 2" Class 200 | do | 1.10 | 2.45 | 1.40 |
| 4" Class 200 | do | 2.25 | 3.80 | 2.18 |
| 6" Class 200 | do | 4.14 | 6.43 | 3.68 |
| Gate valves | | | | |
| 2" | ea. | 131.41 | 165.29 | 143.34 |
| 2 1/2" | do | 153.91 | 184.91 | 160.37 |
| 3" | do | 170.48 | 211.33 | 183.28 |
| 4" | do | 213.10 | 240.74 | 208.78 |
| 6" | do | 291.24 | 290.84 | 252.23 |
| 8" | do | 350.44 | 413.57 | 358.99 |
| Service meters and tap | do | 214.29 | 268.60 | 198.80 |
| Example system | Subtotal 2/ | 365,676.91 | 550,032.60 | 326,150.49 |

1/ Reported costs for 1977 were updated to Dec. 1978 by means of the U.S. Dept. of Com. Composite Construction Cost Index as reported in (2,3).

2/ Subtotal of capital costs for distribution pipe, gate valves, and service meters required for example system depicted in (3).

Sources: (2,3).

Except for the all-metal fire stations, capital costs for fire apparatus and labor costs were very similar for the Great Plains and Ozarks regions (tables 5, 6). However, list prices for fire trucks were likely obtained from some of the same dealerships in both studies. And labor costs were obtained from the same association in both studies.

This similarity in data sources, however, enabled us to compare the usage of various indices for updating 1975 costs. The overall Consumer Price Index for all urban consumers (CPI-U) yielded updated Great Plains cost estimates for fire trucks which were closer to the May, 1981, Ozark estimates than did the CPI-U item index for new cars or the Producer Prices index for motor vehicles and equipment. Similarly, the overall CPI-U index yielded closer cost estimates for labor than did the index for

Table 3--Comparision of annual operating costs for Missouri and Oklahoma rural water districts, 1978.

| Area and type of supply | Annual operating costs | |
|---|---|---|
| | Per hookup | 200 hookups |
| | Dollars | |
| Oklahoma 1/ | | |
| Well supply without treatment | 73.45 | 14,690 |
| Purchase treated water | 75.87 | 15,174 |
| Missouri | | |
| Well supply without treatment | 61.15 | 12,230 |
| Purchase treated water | 99.05 | 19,810 |

1/ Reported costs for 1977 were updated to 1978 by means of the Consumer Price Index as reported in (2).

Sources: (2,3).

average hourly earnings for services. In general, it appears that the usage of specific item indices instead of the more familiar CPI-U index is not warranted.

## SUMMARY AND IMPLICATIONS

Most of the studies completed since the Local Decisions Project of the Economic Development Division began in 1973 have been budget analyses of various community services. Methods for estimating need or usage and capital and operating costs for various service alternatives were presented in each study.

The techniques developed in each of the studies have not been community-specific; i.e., decisionmakers in other towns within a given study area (the Great Plains or the Ozarks) have been able to use the results when planning new or adding to existing community services. Indeed, this has been a major objective of the Project. The question of estimate transferability to other regions of the Nation is addressed in this report.

Based upon studies of rural water systems and rural fire protection services, estimates of needs are area-specific. Estimates of costs are also area-specific unless the areas are very similar and within the same general region of the country. The analytical methods and budgetary forms presented in the Local Decisions reports are usable anywhere. However, estimates of needs and most per-unit costs presented in these reports require local verification and probable modification before usage in other regions of the Nation. This is especially true for costs of items which are not produced by a few manufacturers and marketed nationwide.

Table 4--Comparison of annual fire frequency coefficients for Oklahoma Great Plains and Missouri-Oklahoma Ozarks region.

| Type of fire | Great Plains point estimate 1974 | Ozarks 1979 | | |
|---|---|---|---|---|
| | | Point estimate | Range 1/ High | Range 1/ Low |
| | | Fire frequency coefficients 2/ | | |
| Acreage 3/ | 8,043 | 5,125 | 4,471 | 6,002 |
| Registered vehicles 4/ | 397 | 265 | 236 | 301 |
| Residential units 5/ | 162 | 62 | 56 | 69 |
| Businesses 6/ | 36 | 12 | 11 | 14 |
| Other fires(based on population) 7/ | 303 | 386 | 337 | 452 |
| | | Total no. of fires | | |
| Example community 8/ | 8 | 12 | 13 | 10 |

1/ Based on 95 percent confidence intervals.

2/ To be interpreted as, for example, one open-area land fire per year for every 8,043 acres in the Great Plains area.

3/ Includes fields, parks, public land, dumps, road property, railroad right-of-ways, bridges, trestles, and lawns.

4/ Includes automobiles, motor homes, travel trailers, road transport vehicles, trucks, motorcycles, vans, trailers, and others.

5/ Includes houses, apartments, hotels, motels, dormitories, mobile homes, and other residential units.

6/ Includes industrial or manufacturing establishments, mercantile establishments, and offices.

7/ Includes institutions, places of public assembly, schools, storage facilities, other special property, railroad cars, aircraft, heavy equipment, agricultural equipment, and watercraft.

8/ As reported in (4).

Sources: (1,4).

Table 5--Selected capital costs for rural fire protection systems, Oklahoma Great Plains and Missouri-Oklahoma Ozarks regions, May 1981

| Item | Great Plains | Ozarks |
|---|---|---|
| | Dollars | |
| Large fire truck or standard pumper 1/ | 52,982 | 52,900 |
| Pickup with slide-on unit 1/ | 19,107 | 18,900 |
| Station 2/ | 27,503 | 48,600 |
| Firemen's suits 3/ | 167 | 210 |

1/These fire apparatus are similar but not comparable in all details. Reported costs for 1975 were updated to May 1981 by means of the Consumer Price Index - all Urban Consumers (CPI-U).

2/Reported costs for 1975 were updated to May 1981 by means of the U.S. Department of Commerce Composite Construction Cost Index.

3/Reported cost was updated to May 1981 by means of the CPI-U index.

Table 6--Annual labor costs for fire protection systems in Oklahoma, 1980

| Position | Oklahoma statewide reported for Great Plains 1/ | Oklahoma rural Ozarks |
|---|---|---|
| | Dollars | |
| Chief | 11,374 | 11,784 |
| Assistant chief | 10,733 | 10,560 |
| Beginning firefighter | 8,971 | 9,072 |

1/Reported costs for 1975 were updated to 1980 by means of the Consumer Price Index - all Urban Consumers.

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